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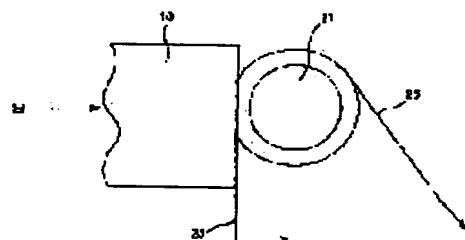
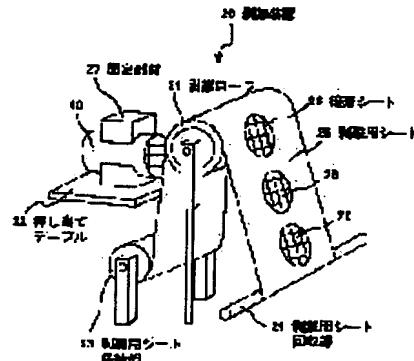
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## (54) METHOD AND DEVICE FOR STRIPPING ADHESIVE SHEET

## (57) Abstract:

**PROBLEM TO BE SOLVED:** To provide a method of stripping an adhesive sheet, in which the adhesive sheet stuck to the end face of a honeycomb filter is rapidly and surely stripped from the end face of the honeycomb filter without damaging the end face.

**SOLUTION:** In the method of stripping plural adhesive sheets stuck to the end face of the honeycomb filter structured by binding plural prismatic porous ceramic members each having many through-holes arranged side by side in the longitudinal direction across a partition wall which functions as a filter for collecting particles, plural adhesive sheets are stripped from the end face of the honeycomb filter by pressing a stripping sheet coated with an adhesive having stronger adhesive strength than that of the adhesive sheet on the end face of the honeycomb filter to stick the adhesive sheet to the stripping sheet, and then pulling off the stripping sheet.



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CLAIMS

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## [Claim(s)]

[Claim 1] Two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and were installed in the longitudinal direction side by side band together through a glue line. It is the approach of exfoliating two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum which separates said breakthrough might function as a filter for particle uptake. The sheet for exfoliation which applied the binder which has adhesion stronger than the adhesion of said adhesion sheet. The exfoliation approach of the adhesion sheet characterized by making said two or more adhesion sheets exfoliate from the end face of said honeycomb filter by pressing against the end face of said honeycomb filter, pasting up said adhesion sheet on said sheet for exfoliation, and pulling apart said sheet for exfoliation from said end face after that.

[Claim 2] The exfoliation approach of an adhesion sheet according to claim 1 of pressing the sheet for exfoliation against the end face of said honeycomb filter, and pasting up an adhesion sheet on said sheet for exfoliation by rolling a roller along with the end face of a honeycomb filter.

[Claim 3] The front face of a roller at least is the exfoliation approach of the adhesion sheet according to claim 2 which consists of an elastic body which has the degree of hardness of 40-60 degrees.

[Claim 4] The front face of a roller at least is the exfoliation approach of the adhesion sheet according to claim 2 or 3 which consists of urethane system foamed rubber or chloroprene system sponge rubber.

[Claim 5] Two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and were installed in the longitudinal direction side by side band together through a glue line. It is exfoliation equipment for exfoliating two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum which separates said breakthrough might function as a filter for particle uptake. An exfoliation roller, The roller driving means which moves said exfoliation roller to parallel along with the end face of said honeycomb filter, The holdown member which is pressed, holds said honeycomb filter and is fixed on a table and said push reliance table, The table driving means which moves said push reliance table in the direction vertical to the end face of said honeycomb filter, The sheet attaching part for exfoliation held where the sheet for exfoliation is twisted, and the sheet stripping section for exfoliation which rolls round said sheet for exfoliation through said exfoliation roller are used as the main configuration members. Said sheet for exfoliation pulled out from said sheet attaching part for exfoliation is exfoliation equipment characterized by being constituted so that said adhesion sheet may be pasted, when said exfoliation roller moves to parallel along with the end face of said honeycomb filter.

[Claim 6] The front face of an exfoliation roller at least is exfoliation equipment according to claim 5 which consists of an elastic body which has the degree of hardness of 40-60 degrees.

[Claim 7] The front face of an exfoliation roller at least is exfoliation equipment according to claim 5 or 6 which consists of urethane system foamed rubber or chloroprene system sponge rubber.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the exfoliation approach of the adhesion sheet which can exfoliate promptly and certainly, and exfoliation equipment, without damaging this end face, in case the adhesion sheet pasted up on the end face of a honeycomb filter is exfoliated from the end face of a honeycomb filter.

[0002]

[Description of the Prior Art] It poses a problem that the particulate contained in the exhaust gas discharged by internal combustion engines, such as cars, such as an automobile, a bus, and a truck, and a construction equipment, does damage to an environment or the body recently. By passing a porosity ceramic for this exhaust gas, the ceramic filter which carries out uptake of the particulate in exhaust gas, and purifies exhaust gas is proposed variously.

[0003] The porosity ceramic member 30 which such a ceramic filter becomes from two or more silicon carbide etc. like the honeycomb filter 10 usually shown in drawing 1 bands together through a glue line 14, and constitutes a hollow clay building block 15, and the sealant layer 13 is formed in the perimeter of this hollow clay building block 15. Moreover, as this porosity ceramic member 30 was shown in drawing 2, many breakthroughs 31 are installed in a longitudinal direction side by side, and the septum 33 which separates breakthrough 31 comrades functions as a filter.

[0004] That is, as the breakthrough 31 formed in the porosity ceramic member 30 was shown in drawing 2 (b), the exhaust gas with which either the entry side of exhaust gas or the edge of an outlet side flowed into \*\*\*\*\* and the breakthrough 31 of 1 with the filler 32 flows out of other breakthroughs 31, after passing the septum 33 which surely separates a breakthrough 31.

[0005] In an exhaust gas purge, the honeycomb filter 10 of such a configuration is installed in an internal combustion engine's flueway, in case the particulate in the exhaust gas discharged by the internal combustion engine passes this honeycomb filter 10, it is caught by the septum 33, and exhaust gas is purified.

[0006] Here, when the sealant layer 13 installs a honeycomb filter 10 in an internal combustion engine's flueway, it is prepared for the object of preventing that exhaust gas begins to leak from the periphery section of a honeycomb filter 10.

[0007] In order to form such a sealant layer 13 in the periphery section of a honeycomb filter 10 conventionally, first, more than one band the porosity ceramic member 30 together through a glue line 14, a hollow clay building block 15 is produced, and those shaft orientations are made to support to revolve and rotate this hollow clay building block 15.

[0008] Next, after making the sealant paste for forming the sealant layer 13 adhere to the periphery section of a hollow clay building block 15, the sealant layer 13 was formed in the periphery section of a hollow clay building block 15 by contacting plate-like part material to the above-mentioned sealant paste, extending the above-mentioned sealant paste in uniform thickness, forming a paste layer, and drying and solidifying this paste layer.

[0009] However, when it was going to form the sealant layer 13 in the periphery section of a hollow clay building block 15 by such approach, the above-mentioned sealant paste might adhere to the part by which the flash and the breakthrough 31 are formed in the end-face part of a hollow clay building block 15, and might close the breakthrough 31. Thus, if a sealant paste closes a breakthrough 31, a breakthrough 31 will become blinding and the function as a filter of a honeycomb filter 10 will fall.

[0010] Then, in order to prevent the blinding of such a breakthrough 31, when forming the sealant layer 13 in the periphery section of a hollow clay building block 15, the adhesion sheet etc. needed to be pasted up and covered in the ends side of a hollow clay building block 15.

[0011] However, since exfoliation of the adhesion sheet adhered to the ends side of such a honeycomb filter was manually performed using the cutter, the knife, etc., it was a thing inferior to productivity. Moreover, there was a case where the end face of the above-mentioned honeycomb filter was damaged with the above-mentioned cutter or a knife.

[0012]

[Problem(s) to be Solved by the Invention] This invention was made in order to solve these problems, and it is to offer the exfoliation approach of the adhesion sheet which can exfoliate promptly and certainly, and exfoliation equipment, without damaging this end face, in case the adhesion sheet pasted up on the end face of a honeycomb filter is exfoliated from the end face of a honeycomb filter.

[0013]

[Means for Solving the Problem] Two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and the exfoliation approach of the adhesion sheet of this invention was installed in the longitudinal direction side by side band together through a glue line. It is the approach of exfoliating two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum which separates the above-mentioned breakthrough might function as a filter for particle uptake. The sheet for exfoliation which applied the binder which has adhesion stronger than the adhesion of the above-mentioned adhesion sheet It is characterized by making two or more above-mentioned adhesion sheets exfoliate from the end face of the above-mentioned honeycomb filter by pressing against the end face of the above-mentioned honeycomb filter, pasting up the above-mentioned adhesion sheet on the above-mentioned sheet for exfoliation, and pulling apart the above-mentioned sheet for exfoliation from the above-mentioned end face after that.

[0014] Moreover, two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and the exfoliation equipment of this invention was installed in the longitudinal direction side by side band together through a glue line. It is exfoliation equipment for exfoliating two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum which separates the above-mentioned breakthrough might function as a filter for particle uptake. An exfoliation roller, The roller driving means which moves the above-mentioned exfoliation roller to parallel along with the end face of the above-mentioned honeycomb filter, The holddown member which is pressed, holds the above-mentioned honeycomb filter and is

fixed on a table and the above-mentioned push reliance table, The table driving means which moves the above-mentioned push reliance table in the direction vertical to the end face of the above-mentioned honeycomb filter, The sheet attaching part for exfoliation held where the sheet for exfoliation is twisted, and the sheet stripping section for exfoliation which rolls round the above-mentioned sheet for exfoliation through the above-mentioned exfoliation roller are used as the main configuration members. The above-mentioned sheet for exfoliation pulled out from the above-mentioned sheet attaching part for exfoliation is characterized by being constituted so that the above-mentioned adhesion sheet may be pasted, when the above-mentioned exfoliation roller moves to parallel along with the end face of the above-mentioned honeycomb filter. Hereafter, the exfoliation approach of the adhesion sheet of this invention and exfoliation equipment are explained.

[0015]

[Embodiment of the Invention] Two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and the exfoliation approach of the adhesion sheet of this invention was installed in the longitudinal direction side by side band together through a glue line. It is the approach of exfoliating two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum which separates the above-mentioned breakthrough might function as a filter for particle uptake. The sheet for exfoliation which applied the binder which has adhesion stronger than the adhesion of the above-mentioned adhesion sheet It is characterized by making two or more above-mentioned adhesion sheets exfoliate from the end face of the above-mentioned honeycomb filter by pressing against the end face of the above-mentioned honeycomb filter, pasting up the above-mentioned adhesion sheet on the above-mentioned sheet for exfoliation, and pulling apart the above-mentioned sheet for exfoliation from the above-mentioned end face after that.

[0016] In the exfoliation approach of the adhesion sheet of this invention, the honeycomb filter set as the object of adhesion of the above-mentioned adhesion sheet can mention the same thing as the honeycomb filter 10 explained by the above-mentioned Prior art. Therefore, explanation about the structure is given here to omit. In addition, about the manufacture approach of the above-mentioned honeycomb filter, it mentions later.

[0017] In the exfoliation approach of the adhesion sheet of this invention, first, rather than the adhesion of the adhesion sheet stuck on the end face of a honeycomb filter, the sheet for exfoliation which applied the binder which has strong adhesion is pressed against the end face of the above-mentioned honeycomb filter, and the above-mentioned adhesion sheet is pasted up on the above-mentioned sheet for exfoliation.

[0018] What was not limited especially when it had a certain amount of thermal resistance as the above-mentioned adhesion sheet, reinforcement, and a rate of low expanding, for example, applied the heat-resistant rubber system binder to polyester film as a binder can be mentioned.

[0019] As for the above-mentioned adhesion sheet, it is desirable to have the thermal resistance of 120 degrees C or more. When thermal resistance is less than 120 degrees C, in the desiccation process at the time of manufacturing a honeycomb filter etc., the above-mentioned adhesion sheet may decompose and it may separate. As for the thermal resistance of the above-mentioned adhesion sheet, it is more desirable that it is 150 degrees C or more.

[0020] As for the above-mentioned adhesion sheet, it is desirable to have the hauling load of 5-15kg / 19mm width of face in an about 150-degree C temperature field. When hauling loads are under 5kg / 19mm width of face, it is in the middle of manufacture of a honeycomb filter, and an adhesion sheet may be damaged. On the other hand, since it has sufficient reinforcement when a hauling load exceeds 15kg / 19mm width of face, the adhesion sheet which has the reinforcement beyond this causes the jump of a manufacturing cost.

[0021] As for the above-mentioned adhesion sheet, it is desirable that it is what has 30 - 150% of rate of expanding in an about 150-degree C temperature field. An adhesion sheet becomes it weak that the rate of expanding is less than 30%, and it becomes easy to fracture. On the other hand, since an adhesion sheet will develop in case the layered product which finished setting up a ceramic member is cut and it cuts in the configuration of a hollow clay building block if the rate of expanding exceeds 150%, it is not cut by the same configuration as a hollow clay building block, but it may adhere to the periphery section of a hollow clay building block, or a ball-like lump may be generated. Moreover, it may separate in the case of a cut.

[0022] As for the adhesion of the above-mentioned adhesion sheet, it is desirable that it is 500 - 2000g/19mm width of face. When adhesion is under 500g/19mm width of face, it may exfoliate, before forming an adhesives layer and a sealant layer. On the other hand, if adhesion exceeds 2000g/19mm width of face, it will become difficult at the exfoliation process of an adhesion sheet to exfoliate an adhesion sheet thoroughly.

[0023] As a sheet for exfoliation which applied the binder which has adhesion stronger than the adhesion of the above-mentioned adhesion sheet, what applied the rubber system binder to polyester film can be mentioned, for example.

[0024] As for the adhesion of the above-mentioned sheet for exfoliation, it is desirable that it is 3000 - 8000g/25mm width of face. Adhesion is inadequate in adhesion being under 3000g/25mm width of face, and an adhesion sheet may be unable to be thoroughly exfoliated from the end face of a honeycomb filter. On the other hand, since adhesion is too strong when adhesion exceeds 8000g/25mm width of face, the sheet for exfoliation which is sufficient adhesion for it to be inferior to handling nature, and exfoliate an adhesion sheet, and has the adhesion beyond this causes the jump of a manufacturing cost.

[0025] Moreover, although the configuration of the above-mentioned sheet for exfoliation can mention the thing of the end face of a honeycomb filter, and configurations of arbitration, such as the shape of the shape of abbreviation isomorphism, and a rectangle, it needs to be what can cover the end face of a honeycomb filter thoroughly as the size. It is because it is necessary to paste up thoroughly the adhesion sheet stuck all over the abbreviation for the end face of a honeycomb filter.

[0026] Moreover, the configuration of the above-mentioned sheet for exfoliation may be beltlike. By the reason same also in this case as the above, the width of face of the sheet for exfoliation needs to be larger than the diameter of the end face of a honeycomb filter.

[0027] Especially the thickness of the above-mentioned sheet for exfoliation is not limited, for example, it is desirable that it is 25-50 micrometers. It may cut, in case the reinforcement of the sheet for exfoliation falls that it is less than 25 micrometers and it pulls away from the end face of a next honeycomb filter. On the other hand, although the reinforcement is enough if it exceeds 50 micrometers, it becomes hard and will be inferior to the handling nature.

[0028] Although it is not limited especially as an approach of pressing such a sheet for exfoliation against the end face of a honeycomb filter but can press by the approach of arbitration, the approach of rolling a roller along with the end face of a honeycomb filter is desirable. It is because the sheet for exfoliation can be pressed against the end face of a honeycomb filter by uniform thrust.

[0029] Although the diameter of the above-mentioned roller is suitably adjusted according to the diameter of the end face of the honeycomb filter which is the object to press, it is desirable that it is about 50-200mm. Rolling to the other end which faced the roller across the core from the end section of the end face of a honeycomb filter as a diameter is less than 50mm takes time amount, and lowering of productivity is caused. On the other hand, if a diameter exceeds 200mm, it will become difficult to press an adhesion sheet against the end face of a honeycomb filter by uniform press.

[0030] Moreover, as for especially the width of face of the above-mentioned roller, it is desirable to be adjusted so that it may not be limited but may become somewhat larger than the diameter of the end face of a honeycomb filter. It is because what is necessary is to roll the above-mentioned roller along with the end face of a honeycomb filter only at once.

[0031] Moreover, as for the front face of the above-mentioned roller at least, it is desirable that it is the elastic body which has the degree of hardness of 40-60 degrees. When the sheet for exfoliation is pressed against the end face of a honeycomb filter using the above-mentioned roller, it is for preventing breakage of the sheet for exfoliation, an adhesion sheet, and the end face of a honeycomb filter.

[0032] As for the above-mentioned elastic body, it is desirable to be formed by the thickness of at least 5mm from the front face of the above-mentioned roller. When a roller is pressed against the end face of a honeycomb filter as the thickness of an elastic body is less than 5mm, the above-mentioned elastic body deforms, press starts even the elastic body agenesis part of a roller, and there are a sheet for exfoliation, an adhesion sheet, and a possibility that the end face of a honeycomb filter may be damaged. In addition, since it is "even if few", the above-mentioned whole roller may consist of the above-mentioned elastic body.

[0033] As the above-mentioned elastic body, it is desirable that they are urethane system foamed rubber or chloroprene system sponge rubber. When it has a moderate degree of hardness and the sheet for exfoliation is pressed against the end face of a honeycomb filter, it is because the part in contact with the end face of a honeycomb filter can deform moderately and the sheet for exfoliation and an adhesion sheet can be stuck certainly.

[0034] Moreover, as the above-mentioned elastic body, it is most desirable that it is neoprene sponge rubber. When it has 50 degrees and a suitable degree of hardness and presses against the end face of a honeycomb filter, it is because the above-mentioned neoprene sponge rubber which does not damage the end face of the sheet for exfoliation, an adhesion sheet, and a honeycomb filter, and contacts the end face of a honeycomb filter can deform moderately and the whole adhesion sheet can be certainly stuck on the sheet for exfoliation. Moreover, it excels also in the workability.

[0035] As an example of other elastic bodies, plastics foam, such as elastomers, such as synthetic rubber and polyisobutylenes, such as styrene-butadiene rubber, butadiene rubber, polyisoprene rubber, chloroprene rubber, polyurethane rubber, and silicone rubber, and polyethylene, foaming polyurethane, form polystyrene, polyethylene foam, and polypropylene foam, other natural rubber, sponge rubber, etc. can be mentioned, for example.

[0036] Moreover, it is not limited especially as an ingredient which constitutes parts other than the above-mentioned elastic body of the above-mentioned roller, for example, ingredients, such as a ceramic, resin, and a metal, can be mentioned.

[0037] Next, after pressing the sheet for exfoliation against the end face of a honeycomb filter and sticking an adhesion sheet on the sheet for exfoliation, two or more above-mentioned adhesion sheets are made to exfoliate from the end face of a honeycomb filter by pulling apart the above-mentioned sheet for exfoliation from the end face of a honeycomb filter.

[0038] In case the sheet for exfoliation is pulled apart from the end face of a honeycomb filter, as an include angle (length separation angle) which the above-mentioned sheet for exfoliation and the end face of a honeycomb filter accomplish, it is desirable that it is 15-60 degrees. If a pulling-apart angle is less than 15 degrees -- the sheet for exfoliation -- the end face of a honeycomb filter -- abbreviation -- before pulling in the parallel direction, big shearing force's acting between the sheet for exfoliation, and the end face of a honeycomb filter and an adhesion sheet's separating from the end face of a honeycomb filter, it may shift in the direction of hauling, and binders, such as the above-mentioned heat-resistant rubber system binder, may adhere to the end face of a honeycomb filter On the other hand, when a length separation angle exceeds 60 degrees, the pulling-apart rate of the sheet for exfoliation becomes large too much, and an adhesion sheet may remain in the end face of a honeycomb filter.

[0039] Moreover, in case the sheet for exfoliation is pulled apart from the end face of a honeycomb filter, it is desirable to carry out rolling the above-mentioned roller towards the time of pasting up the sheet for exfoliation and reverse. It is because the above-mentioned length separation angle can always be made regularity.

[0040] Next, in this invention, the manufacture approach of a honeycomb filter that the adhesion sheet set as the object of exfoliation processing was stuck is explained, referring to a drawing.

[0041] First, the porosity ceramic member 30 of the prism configuration by which the breakthrough 31 of a large number as shown in drawing 1 separated the septum 33, and was installed in the longitudinal direction side by side produces the hollow clay building block 15 of structure which banded together through the glue line 14.

[0042] Although it is not limited especially as a ceramic ingredient which constitutes the porosity ceramic member 30 but various ceramics are mentioned, in these, thermal resistance is large, it excels in a mechanical property and large silicon carbide of thermal conductivity is desirable.

[0043] As for the porosity ceramic member 30, it is desirable that it is what mean particle diameter becomes from the ceramic crystal which is 2-150 micrometers, and its 10-70 micrometers are more desirable. In order for the pore diameter of the pore which exists that the mean particle diameter of the above-mentioned ceramic crystal is less than 2 micrometers in the interior of the porosity ceramic member 30 to become small too much and to start blinding immediately, functioning as a filter becomes difficult. On the other hand, when the mean particle diameter of the above-mentioned ceramic crystal exceeds 150 micrometers, the pore diameter of the pore which exists in the interior becomes large too much, and there is a possibility that the reinforcement of the porosity ceramic member 30 may fall. Moreover, it is not so easy to manufacture the porosity ceramic member 30 which has the open pore of a predetermined rate and has the ceramic crystal that mean particle diameter exceeds 150 micrometers itself.

[0044] An adhesion sheet is stuck on the ends side of such a porosity ceramic member 30. It is for protecting the breakthrough of a large number formed in the porosity ceramic member 30. With a machine arm, the adhesion sheet which it was not limited especially as an approach of sticking the above-mentioned adhesion sheet on the ends side of the porosity ceramic member 30, for example, was cut into the end-face configuration of the porosity ceramic member 30 may be stuck automatically, and may be stuck by hand.

[0045] Next, so that it can accumulate after the porosity ceramic member 30 has inclined aslant as shown in drawing 4 After laying the porosity ceramic member 30 in the condition of having inclined, on the base 60 constituted by the cross-section configuration of V characters, Apply the adhesives of the shape of a paste used as a glue line 14 to two side faces 30a and 30b in which the upside was turned to, by uniform thickness, and an adhesives layer is formed in them. On this adhesives layer, the process which carries out the laminating of other porosity ceramic members 30 one by one is repeated, and the layered product of the prismatic form porosity ceramic member 30 of predetermined magnitude is produced.

[0046] Next, the layered product of this porosity ceramic member 30 can be heated on 50-150 degrees C and the conditions of about 1 hour, the above-mentioned adhesives layer can be dried and solidified, it can consider as a glue line 14, and a hollow clay building block 15 can be produced by cutting in a configuration as showed that periphery section to drawing 1 using after that, for example, a diamond cutter etc. Under the present circumstances, the above-mentioned adhesion sheet is cut by the same configuration as the cut porosity ceramic member 30, without separating or becoming a different configuration from the cut porosity ceramic member 30.

[0047] The paste which will not be limited as adhesives of the shape of a paste used as a glue line 14 especially if it has thermal

resistance, for example, contains an organic binder, an inorganic binder, an inorganic fiber, and an inorganic particle can be mentioned. The paste which consists of such a presentation becomes the thing excellent also in thermal conductivity while familiarity by the porosity ceramic is well excellent in bond strength.

[0048] And into the periphery part of the hollow clay building block 15 which carried out in this way and was produced, the sealant 13 which consists of the same ingredient as the above-mentioned glue line 14 can be formed, and the honeycomb filter 10 which the adhesion sheet set as the object of the exfoliation approach of the adhesion sheet of this invention pasted up can be obtained by drying and solidifying.

[0049] It pastes up with the sheet for exfoliation which has adhesion stronger than the adhesion of this adhesion sheet for two or more whole adhesion sheets stuck on the end face of a honeycomb filter, and the exfoliation approach of the adhesion sheet of this invention is the approach of pulling apart the above-mentioned sheet for exfoliation after that. Therefore, the above-mentioned sheet for exfoliation is pasted firmly, and the above-mentioned adhesion sheet can be made to exfoliate promptly and certainly in connection with pulling apart of the above-mentioned sheet for exfoliation, without damaging this end face from the end face of a honeycomb filter.

[0050] For example, size of the sheet for exfoliation is made big, this sheet for exfoliation is simultaneously pressed against the end face of two or more honeycomb filters, and the adhesion sheet simultaneously stuck on the end face of two or more honeycomb filters may be made to exfoliate by pulling apart the above-mentioned sheet for exfoliation after that in the exfoliation approach of the above-mentioned adhesion sheet.

[0051] Moreover, although the above-mentioned adhesion sheet was pasted up on the above-mentioned sheet for exfoliation by pressing the sheet for exfoliation against the end face of a honeycomb filter in the exfoliation approach of the above-mentioned adhesion sheet The exfoliation approach of the adhesion sheet of this invention fixes for example, the sheet for exfoliation on the table. The end face of a honeycomb filter may be pressed against this sheet for exfoliation, two or more adhesion sheets and sheets for exfoliation which were stuck on this end face may be pasted up on it, and the approach of pulling apart a honeycomb filter may be adopted after that.

[0052] In this case, it is desirable to form an elastic body which was mentioned above in the part which presses the end face of the honeycomb filter of the above-mentioned table. It is for preventing breakage of the end face of a honeycomb filter, an adhesion sheet, and the sheet for exfoliation.

[0053] Next, it explains, referring to a drawing about the exfoliation equipment of this invention.

[0054] Two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and the exfoliation equipment of this invention was installed in the longitudinal direction side by side band together through a glue line. It is exfoliation equipment for exfoliating two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum which separates the above-mentioned breakthrough might function as a filter for particle uptake. An exfoliation roller, The roller driving means which moves the above-mentioned exfoliation roller to parallel along with the end face of the above-mentioned honeycomb filter, The holdown member which is pressed, holds the above-mentioned honeycomb filter and is fixed on a table and the above-mentioned push reliance table, The table driving means which moves the above-mentioned push reliance table in the direction vertical to the end face of the above-mentioned honeycomb filter, The sheet attaching part for exfoliation held where the sheet for exfoliation is twisted, and the sheet stripping section for exfoliation which rolls round the above-mentioned sheet for exfoliation through the above-mentioned exfoliation roller are used as the main configuration members. The above-mentioned sheet for exfoliation pulled out from the above-mentioned sheet attaching part for exfoliation is characterized by being constituted so that the above-mentioned adhesion sheet may be pasted, when the above-mentioned exfoliation roller moves to parallel along with the end face of the above-mentioned honeycomb filter.

[0055] Drawing 3 (a) is the perspective view having shown an example of the exfoliation equipment of this invention typically, and (b) is the partial amplification front view.

[0056] The exfoliation equipment 20 of this invention is mainly equipped with the exfoliation roller 21 and the roller driving means (not shown) which presses, and consists of a table 22, a sheet attaching part 23 for exfoliation, and a sheet stripping section 24 for exfoliation, and the exfoliation roller 21 makes move this exfoliation roller 21 to parallel along with the end face of a honeycomb filter 10 as shown in drawing 3 . The sheet attaching part 23 for exfoliation which held the sheet 25 for exfoliation in the condition of having twisted, under the exfoliation roller 21 is formed, and the sheet 25 for exfoliation pulled out from this sheet attaching part 23 for exfoliation is rolled round through the exfoliation roller 21 by the sheet stripping section 24 for exfoliation in which the exfoliation roller 21 was similarly formed caudad.

[0057] Moreover, it can be made to move in the direction (horizontal) vertical to the end face of the honeycomb filter 10 which the table driving means (not shown) is established while the holdown member 27 held and fixed so that it may press and a honeycomb filter 10 may be put from those upper and lower sides on a table 22 is installed, and pressed by this table driving means, pressed the table 22, and was fixed to the table 22 now.

[0058] The same thing as the roller explained by the exfoliation approach of the above-mentioned adhesion sheet can be used for the exfoliation roller 21. Therefore, suppose that the detailed explanation about the construction material, a configuration, etc. is omitted here. Moreover, the same is said of the sheet 25 for exfoliation, and the adhesion sheet 26.

[0059] As mentioned above, the roller driving means for making parallel move the exfoliation roller 21 to this exfoliation roller 21 along with the end face of a honeycomb filter 10 is established. It is not limited especially as the above-mentioned driving means, for example, an electric motor, a hydraulic piston, the Ayr piston, etc. can be mentioned.

[0060] By making this roller driving means drive, as shown in (b), parallel are made to move the exfoliation roller 21 to the end face of a honeycomb filter 10, and the sheet 25 for exfoliation is pressed against the end face of a honeycomb filter 10. Although the passing speed is suitably adjusted in consideration of the area of the end face of a honeycomb filter 10, the adhesion of the sheet 25 for exfoliation, etc., it is desirable that it is 10 - 40 mm/sec for example. Pressing the sheet 25 for exfoliation against the end face of a honeycomb filter 10 as passing speed is less than 10 mm/sec takes time amount, and it is inferior to productivity. On the other hand, if passing speed exceeds 40 mm/sec, the adhesion sheet 26 may be unable to be certainly pasted up on the sheet 25 for exfoliation.

[0061] If what presses, and is not limited especially as a table 22, for example, consists of a metal, resin, a ceramic, etc. can be mentioned and a honeycomb filter 10 can be laid in the whole surface, it will not be restricted to tabular [ which also illustrated especially the configuration ].

[0062] As construction material of a holdown member 27, it can press and the same thing as a table 22 can be mentioned. Moreover, as long as it is the configuration to which it can hold certainly and the configuration can also fix a honeycomb filter 10, you may be the configuration which puts a honeycomb filter 10 from the upper and lower sides which it was not limited but were illustrated especially, and you may be the configuration which is put from right and left. However, in case a honeycomb filter 10 is held by the holdown member 27 and it fixes, it is necessary to fix so that the end face of a honeycomb filter 10 may not be interrupted. It is

because it is necessary to press the sheet 25 for exfoliation against the end face of a honeycomb filter 10.

[0063] The same thing as the driving means prepared in the exfoliation roller 21 mentioned above as a table driving means for pressing and moving a table 22 horizontally can be mentioned.

[0064] It is for pressing to the location which can press the sheet 25 for exfoliation against the end face of a honeycomb filter 10 with the exfoliation roller 21, and moving a table 22 to press and to move a table 22 at right angles to the end face of a honeycomb filter 10, and it can be moved at the rate of arbitration.

[0065] In addition, it presses, and a table 22 can prepare the above-mentioned driving means in a holdown member 27, and can omit it by making it the structure to which a holdown member 27 can be moved at right angles to the end face of a honeycomb filter.

[0066] Especially if it is the structure which holds the sheet 25 for exfoliation and can be pulled out towards the exfoliation roller 21 as a sheet attaching part 23 for exfoliation, it will not be limited, but as illustrated, it is desirable to be constituted so that it may be pulled out by supporting to revolve the sheet 25 for exfoliation in the condition of having been twisted, in the direction of a revolving shaft, and applying the force more than fixed to the sheet 25 for exfoliation.

[0067] Moreover, when the sheet 25 for exfoliation is pulled out, it needs to be held so that the field in which the binder layer was formed may turn to the end face of a honeycomb filter 10. It is for pasting up the sheet 25 for exfoliation, and the adhesion sheet 26 stuck on the end face of a honeycomb filter 10.

[0068] Although the thing of the shape of a rod which will not be limited especially if the sheet 25 for exfoliation is recoverable as a sheet stripping section 24 for exfoliation, for example, consists of a metal, resin, a ceramic, etc. can be mentioned and especially the configuration is not limited, either, the thing of the shape of a cylinder which was illustrated is desirable. It is because the sheet 25 for exfoliation is recoverable good, rotating. Moreover, the die length is suitably adjusted according to the width of face of the sheet 25 for exfoliation.

[0069] Next, the process which exfoliates two or more adhesion sheets stuck on the end face of a honeycomb filter is explained using the exfoliation equipment of this invention which consists of such a configuration.

[0070] (1) Pull out the sheet 25 for exfoliation and twist around the sheet stripping section 24 for exfoliation through the exfoliation roller 21, after installing so that the field in which the binder layer was first formed in the sheet 25 for exfoliation in the condition of having been twisted around the sheet attaching part 23 for exfoliation may turn to the end face of a honeycomb filter 10.

[0071] (2) Next, by pressing and putting a holdown member 27 between the top face of a table 22 from the upper and lower sides, hold a honeycomb filter 10 and fix. In addition, the exfoliation roller 21 is caudad located rather than the honeycomb filter 10 at this time.

[0072] (3) Next, to the location where the exfoliation roller 21 presses and a right above [ the periphery section by the side of a table 22 ] part intersects the end face of a honeycomb filter 10 by the table driving means which is not illustrated, press, move a table 22 horizontally and fix.

[0073] When the exfoliation roller 21 is pressed against the end face of a honeycomb filter 10 at this time, it presses so that the thrust to generate may serve as 0.05-0.3MPa, and a table 22 is moved and it fixes. The adhesion sheet 26 may be thoroughly pasted up on the sheet 25 for exfoliation as thrust is less than 0.05 MPas. On the other hand, if thrust exceeds 0.3MPa(s), breakage may arise in the end face of the sheet 25 for exfoliation, the adhesion sheet 26, and a honeycomb filter 10.

[0074] (4) Next, paste up the sheet 25 for exfoliation all over two or more adhesion sheets 26 by pressing the sheet 25 for exfoliation against the end face of a honeycomb filter 10, fixing so that the sheet stripping section 24 for exfoliation which twisted the sheet 25 for exfoliation may not be rotated, making it move to parallel (upper part) along with the end face of a honeycomb filter 10 by the roller driving means which does not illustrate the exfoliation roller 21, and rolling the exfoliation roller 21 along with the end face of a honeycomb filter 10. Although especially the width of face of the part to which the exfoliation roller 21 touches the end face of a honeycomb filter 10 through the sheet 25 for exfoliation at this time is not limited, it is desirable that it is around 5mm for example.

[0075] (5) After that, stop the driving means of an exfoliation roller, and once move the exfoliation roller 21 below by rotating the sheet stripping section 24 for exfoliation after fixing so that a stop, then the sheet attaching part 23 for exfoliation may not rotate a motion of the exfoliation roller 21. Thereby, while pulling apart the sheet 25 for exfoliation from the end face of a honeycomb filter 10, the adhesion sheet 26 is made to exfoliate from the end face of a honeycomb filter 10.

[0076] (6) And by the table driving means, press, move a table 22 so that it may separate from the exfoliation roller 21, and remove a honeycomb filter 10. Then, immobilization of the sheet attaching part 23 for exfoliation is canceled, the sheet stripping section 24 for exfoliation is rotated, and the sheet 25 for exfoliation is newly pulled out about 200mm.

[0077] The above (2) By repeating the process of - (6) successively, the exfoliation process of the adhesion sheet stuck on the end face of a honeycomb filter can be performed continuously.

[0078] Since the exfoliation equipment of this invention is as having mentioned above, it can exfoliate promptly and certainly the adhesion sheet stuck on the end face of a honeycomb filter by using the above-mentioned exfoliation equipment, without damaging this end face from the end face of a honeycomb filter.

[0079] Moreover, it is good also as exfoliation equipment which can exfoliate the adhesion sheet stuck on the end face of two or more honeycomb filters at once as a gestalt of another operation of the exfoliation equipment of this invention by pressing, making width of face of a table bigger, and considering as for example, the sheet for exfoliation, and the structure where two or more honeycomb filters can be laid in the above-mentioned push reliance table.

[0080] Moreover, it considers as the gestalt of still more nearly another operation of the exfoliation equipment of this invention, for example, presses, and it is good to even make the honeycomb filter of plurality [ lengthwise direction ] into the structure which can hold a table and can be fixed also as exfoliation equipment which can exfoliate the adhesion sheet stuck at once at the end face of two or more honeycomb filters. Moreover, the exfoliation equipment of this invention may be the structure which made these exfoliation equipments coalesce.

[0081]

[Example] Although an example is hung up over below and this invention is explained to it in more detail, this invention is not limited only to these examples.

[0082] The honeycomb filter which stuck on the ends side the adhesion sheet (NITTO DENKO [ CORP. ] make: No.315) which consists of polyester film which applied the thermosetting rubber system binder as a binder at the beginning of example I was manufactured. In addition, the reinforcement of the above-mentioned adhesion sheet was after 150 degrees C and 4-hour heating, and was 9.5kg / 19mm width of face, the rate of expanding was after 150 degrees C and 4-hour heating, and was 80%, and the adhesion was 1200g/19mm width of face.

[0083] Next, friction test \*\*\*\*\* of two or more adhesion sheets stuck on the end face of the above-mentioned honeycomb filter after installing the above-mentioned honeycomb filter in the holdown member of the exfoliation equipment of this invention explained in the gestalt of the above-mentioned implementation.

[0084] In addition, the sheet for exfoliation was polyester film (Scotch-whisky company make: No.859) which applied the rubber system binder, the width of face was 20cm, and adhesion was 5000gf(s) / 25mm width of face.

[0085] Moreover, it was cylindrical, from the periphery section to 3.5cm consisted of neoprene sponge rubber (degree of hardness of 50 degrees), and the exfoliation roller which constitutes the above-mentioned exfoliation equipment was a thing with a diameter [ of 10cm ], and a width of face of 25cm which other parts become from polyurethane rubber. Moreover, the passing speed with which an exfoliation roller moves the end face of a honeycomb filter to parallel was 35 mm/sec. Moreover, it pressed and the table was a plate made from SUS.

[0086] Moreover, the thrust at the time of pressing the sheet for exfoliation against the end face of a honeycomb filter with an exfoliation roller was 0.15MPa(s).

[0087] In this example 1, the time amount which the exfoliation process of the adhesion sheet stuck on the end face of a honeycomb filter took is 5 seconds/piece, and was able to exfoliate the above-mentioned adhesion sheet thoroughly.

[0088] The polyethylene film (Sumitomo 3 M company make: No.152A, adhesion:3000gf / 25mm width of face) which applied the isobutylene-isoprene-rubber system binder for the sheet for example 2 exfoliation was used, and also the friction test of an adhesion sheet was performed like the example 1.

[0089] Consequently, the time amount which the exfoliation process of the adhesion sheet stuck on the end face of a honeycomb filter took is 5 seconds/piece, and was able to exfoliate the above-mentioned adhesion sheet thoroughly.

[0090] The honeycomb filter which stuck the adhesion sheet on that ends side was manufactured like example of comparison 1 example 1, and the exfoliation process was manually performed for this adhesion sheet using the knife.

[0091] Consequently, in the example 1 of a comparison, the time amount which took the adhesion sheet stuck on the end face of a honeycomb filter to exfoliate thoroughly is 30 seconds/piece, and had some which the chip produced in the part.

[0092] The exfoliation process of the adhesion sheet concerning examples 1 and 2 was a short time very much, and the exfoliation process of the adhesion sheet applied to the example 1 of a comparison to the ability to exfoliate an adhesion sheet certainly was not able to require a long time, and a chip was not able to produce it in the end face of some honeycomb filters, and an adhesion sheet was not able to be exfoliated at once so that clearly from the result of examples 1 and 2 and the example 1 of a comparison.

[0093]

[Effect of the Invention] Since the exfoliation approach of the adhesion sheet of this invention is as above-mentioned, two or more whole adhesion sheets stuck on the end face of a honeycomb filter are pasted up with the sheet for exfoliation which has adhesion stronger than the adhesion of this adhesion sheet. Then, it can be made to exfoliate promptly and certainly, since it is the approach of pulling apart the above-mentioned sheet for exfoliation, without damaging this end face from the end face of a honeycomb filter with the above-mentioned adhesion sheet firmly pasted up on the above-mentioned sheet for exfoliation to pulling apart of the above-mentioned sheet for exfoliation.

[0094] Moreover, since the exfoliation equipment of this invention is as above-mentioned, it can exfoliate an adhesion sheet promptly and certainly by using the exfoliation equipment of this invention, without damaging this end face from the end face of a honeycomb filter.

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[Translation done.]

**\* NOTICES \***

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] It is the perspective view having shown typically 1 operation gestalt of the honeycomb filter which is the object which the sheet for exfoliation presses by the exfoliation approach of the adhesion sheet of this invention.

[Drawing 2] (a) is the perspective view having shown typically the porosity ceramic member which constitutes the honeycomb filter shown in drawing 1, and (b) is the A-A line sectional view.

[Drawing 3] (a) is the perspective view having shown an example of the exfoliation equipment of this invention typically, and (b) is the partial expanded sectional view.

[Drawing 4] It is the explanatory view having shown typically one process of manufacturing the honeycomb filter shown in drawing 1.

**[Description of Notations]**

10 Honeycomb Filter

13 Sealant Layer

14 Glue Line

15 Hollow Clay Building Block

20 Exfoliation Equipment

21 Exfoliation Roller

22 Press and it is Table.

23 Sheet Attaching Part for Exfoliation

24 Sheet Stripping Section for Exfoliation

25 Sheet for Exfoliation

26 Adhesion Sheet

27 Hold-down Member

30 Porosity Ceramic Member

31 Breakthrough

32 Filler

33 Septum

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[Translation done.]

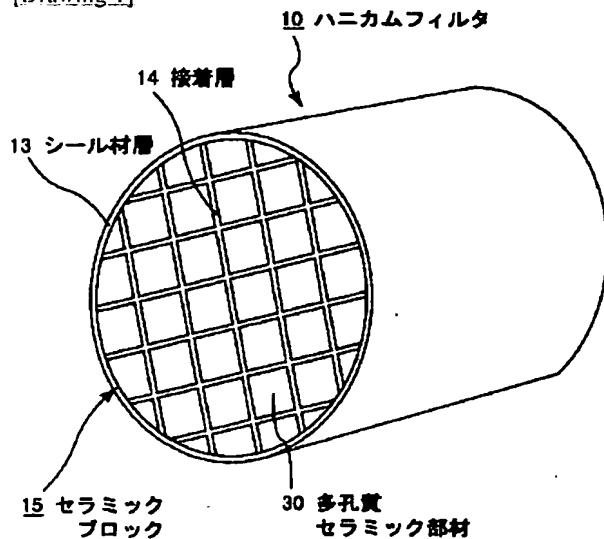
## \* NOTICES \*

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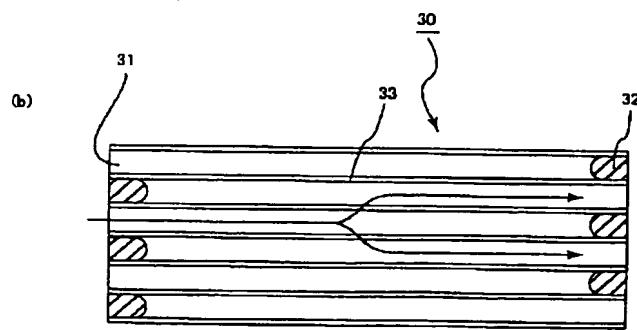
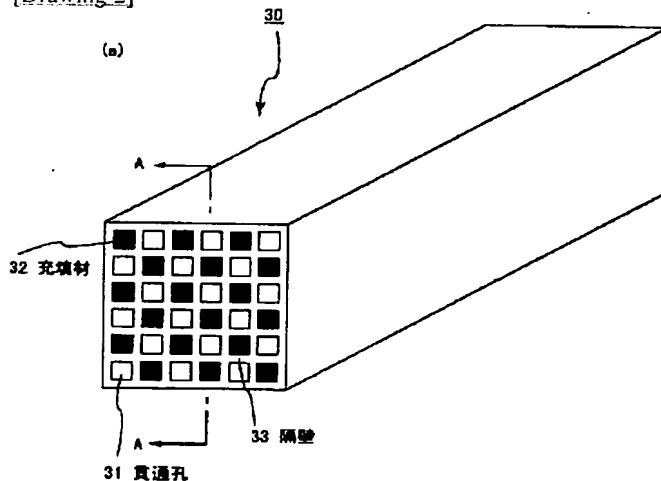
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## DRAWINGS

[Drawing\_1]

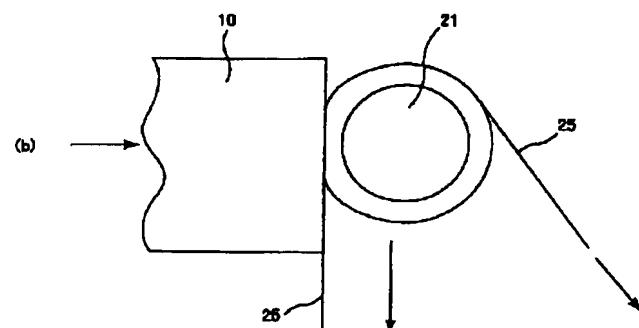
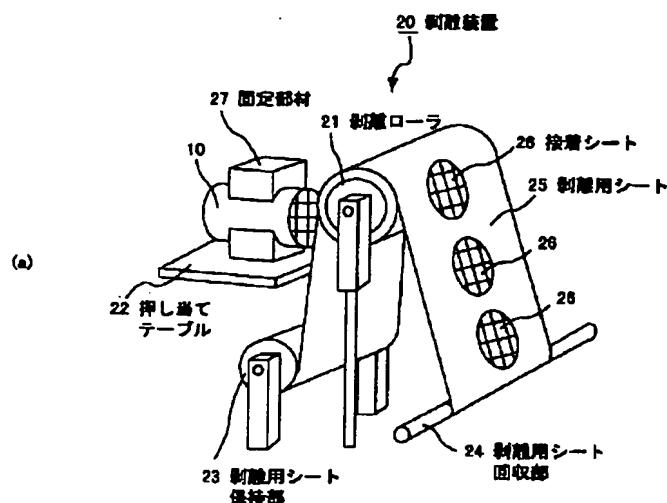


[Drawing\_2]

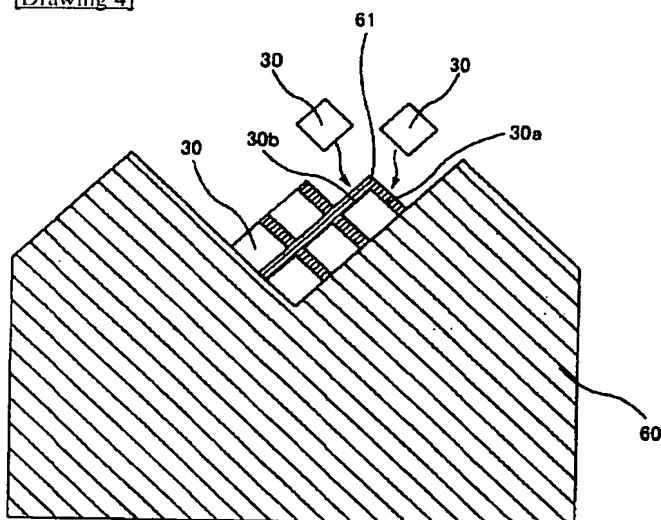


A-A断面図

[Drawing\_3]



[Drawing 4]



[Translation done.]

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## CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law  
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 B01D 39/20

[FI]

B01D 39/00              B  
 B01D 39/20              D

[Procedure amendment]  
 [Filing Date] May 10, Heisei 17 (2005. 5.10)  
 [Procedure amendment 1]  
 [Document to be Amended] Description  
 [Item(s) to be Amended] The name of invention  
 [Method of Amendment] Modification  
 [The content of amendment]

[Title of the Invention] The exfoliation approach of an adhesion sheet, exfoliation equipment, and the manufacture approach of a honeycomb filter

[Procedure amendment 2]  
 [Document to be Amended] Description  
 [Item(s) to be Amended] Claim  
 [Method of Amendment] Modification  
 [The content of amendment]  
 [Claim(s)]  
 [Claim 1]

It is the approach of exfoliating two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum by which two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and were installed in the longitudinal direction side by side band together through a glue line, and separate said breakthrough might function as a filter for particle uptake,

The exfoliation approach of the adhesion sheet characterized by making said two or more adhesion sheets exfoliate from the end face of said honeycomb filter by pressing against the end face of said honeycomb filter the sheet for exfoliation which applied the binder which has strong adhesion, pasting up said adhesion sheet on said sheet for exfoliation, and pulling apart said sheet for exfoliation from the adhesion of said adhesion sheet from said end face after that.

[Claim 2]

The exfoliation approach of an adhesion sheet according to claim 1 of pressing the sheet for exfoliation against the end face of said honeycomb filter, and pasting up an adhesion sheet on said sheet for exfoliation by rolling a roller along with the end face of a honeycomb filter.

[Claim 3]

The front face of a roller at least is the exfoliation approach of the adhesion sheet according to claim 2 which consists of an elastic body which has the degree of hardness of 40-60 degrees.

[Claim 4]

The front face of a roller at least is the exfoliation approach of the adhesion sheet according to claim 2 or 3 which consists of urethane system foamed rubber or chloroprene system sponge rubber.

[Claim 5]

It is exfoliation equipment for exfoliating two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum by which two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and were installed in the longitudinal direction side by side band together through a glue line, and separate said breakthrough might function as a filter for particle uptake,

An exfoliation roller and the roller driving means which moves said exfoliation roller to parallel along with the end face of said honeycomb filter,

The holdown member which is pressed, holds said honeycomb filter and is fixed on a table and said push reliance table, and the table

driving means which moves said push reliance table in the direction vertical to the end face of said honeycomb filter, The sheet attaching part for exfoliation held where the sheet for exfoliation is twisted, Let the sheet stripping sections for exfoliation which roll round said sheet for exfoliation through said exfoliation roller be the main configuration members,

Said sheet for exfoliation pulled out from said sheet attaching part for exfoliation is exfoliation equipment characterized by being constituted so that said adhesion sheet may be pasted, when said exfoliation roller moves to parallel along with the end face of said honeycomb filter.

[Claim 6]

The front face of an exfoliation roller at least is exfoliation equipment according to claim 5 which consists of an elastic body which has the degree of hardness of 40-60 degrees.

[Claim 7]

The front face of an exfoliation roller at least is exfoliation equipment according to claim 5 or 6 which consists of urethane system foamed rubber or chloroprene system sponge rubber.

[Claim 8]

Two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and were installed in the longitudinal direction side by side band together through a glue line. On two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum which separates said breakthrough might function as a filter for particle uptake By pressing the sheet for exfoliation which applied the binder which has strong adhesion, pasting up said adhesion sheet on said sheet for exfoliation, and pulling apart said sheet for exfoliation from the adhesion of said adhesion sheet from said end face after that The manufacture approach of the honeycomb filter characterized by making said two or more adhesion sheets exfoliate from the end face of said honeycomb filter.

[Claim 9]

The adhesion of said adhesion sheet is the manufacture approach of the honeycomb filter according to claim 8 which is 500 - 2000g/19mm width of face.

[Claim 10]

The adhesion of said sheet for exfoliation is the manufacture approach of the honeycomb filter according to claim 8 or 9 which is 3000 - 8000g/25mm width of face.

[Procedure amendment 3]

[Document to be Amended] Description

[Item(s) to be Amended] 0001

[Method of Amendment] Modification

[The content of amendment]

[0001]

[Field of the Invention]

This invention relates to the exfoliation approach of the adhesion sheet which can exfoliate promptly and certainly, exfoliation equipment, and the manufacture approach of a honeycomb filter, without damaging this end face, in case the adhesion sheet pasted up on the end face of a honeycomb filter is exfoliated from the end face of a honeycomb filter.

[Procedure amendment 4]

[Document to be Amended] Description

[Item(s) to be Amended] 0012

[Method of Amendment] Modification

[The content of amendment]

[0012]

[Problem(s) to be Solved by the Invention]

This invention was made in order to solve these problems, and it is to offer the exfoliation approach of the adhesion sheet which can exfoliate promptly and certainly, exfoliation equipment, and the manufacture approach of a honeycomb filter, without damaging this end face, in case the adhesion sheet pasted up on the end face of a honeycomb filter is exfoliated from the end face of a honeycomb filter.

[Procedure amendment 5]

[Document to be Amended] Description

[Item(s) to be Amended] 0014

[Method of Amendment] Modification

[The content of amendment]

[0014]

Moreover, the exfoliation equipment of this invention is exfoliation equipment for exfoliating two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum by which two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and were installed in the longitudinal direction side by side band together through a glue line, and separate the above-mentioned breakthrough might function as a filter for particle uptake,

An exfoliation roller and the roller driving means which moves the above-mentioned exfoliation roller to parallel along with the end face of the above-mentioned honeycomb filter, The holddown member which is pressed, holds the above-mentioned honeycomb filter and is fixed on a table and the above-mentioned push reliance table, Let the table driving means which moves the above-mentioned push reliance table in the direction vertical to the end face of the above-mentioned honeycomb filter, the sheet attaching part for exfoliation held where the sheet for exfoliation is twisted, and the sheet stripping sections for exfoliation which roll round the above-mentioned sheet for exfoliation through the above-mentioned exfoliation roller be the main configuration members,

The above-mentioned sheet for exfoliation pulled out from the above-mentioned sheet attaching part for exfoliation is characterized by being constituted so that the above-mentioned adhesion sheet may be pasted, when the above-mentioned exfoliation roller moves to parallel along with the end face of the above-mentioned honeycomb filter.

Moreover, the manufacture approach of the honeycomb filter of this invention Two or more porosity ceramic members of the prism configuration by which many breakthroughs separated the septum and were installed in the longitudinal direction side by side band together through a glue line. On two or more adhesion sheets stuck on the end face of the honeycomb filter constituted so that the septum which separates the above-mentioned breakthrough might function as a filter for particle uptake By pressing the sheet for exfoliation which applied the binder which has strong adhesion, pasting up the above-mentioned adhesion sheet on the above-mentioned sheet for exfoliation, and pulling apart the above-mentioned sheet for exfoliation from the adhesion of the above-mentioned

adhesion sheet from the above-mentioned end face after that it is characterized by making two or more above-mentioned adhesion sheets exfoliate from the end face of the above-mentioned honeycomb filter.

Hereafter, the exfoliation approach of the adhesion sheet of this invention, exfoliation equipment, and the manufacture approach of a honeycomb filter are explained.

[Procedure amendment 6]

[Document to be Amended] Description

[Item(s) to be Amended] 0040

[Method of Amendment] Modification

[The content of amendment]

[0040]

Next, in this invention, the manufacture approach of a honeycomb filter that the adhesion sheet set as the object of exfoliation processing was stuck is explained, referring to a drawing.

Moreover, the manufacture approach of a honeycomb filter of making an adhesion sheet exfoliating from the honeycomb filter with which the above-mentioned adhesion sheet was stuck is also one of this inventions.

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[Translation done.]

## PATENT ABSTRACTS OF JAPAN

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(51)Int.Cl. B01D 39/00  
B01D 39/20

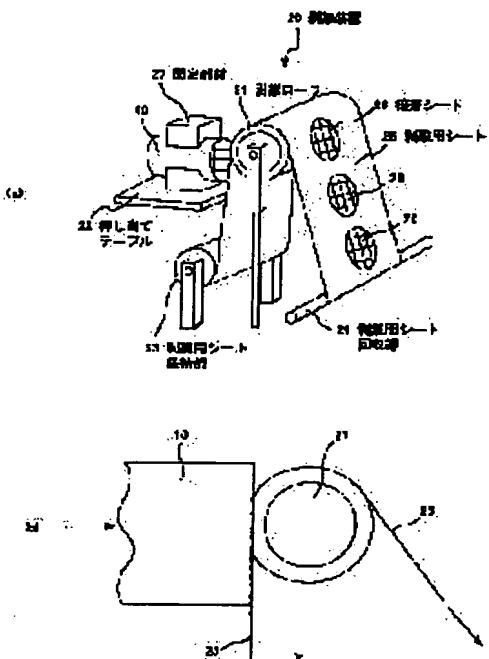
(21)Application number : 2000-332363 (71)Applicant : IBIDEN CO LTD  
(22)Date of filing : 31.10.2000 (72)Inventor : YAMAMURA NORIHIKO

(54) METHOD AND DEVICE FOR STRIPPING ADHESIVE SHEET

(57) Abstract:

**PROBLEM TO BE SOLVED:** To provide a method of stripping an adhesive sheet, in which the adhesive sheet stuck to the end face of a honeycomb filter is rapidly and surely stripped from the end face of the honeycomb filter without damaging the end face.

**SOLUTION:** In the method of stripping plural adhesive sheets stuck to the end face of the honeycomb filter structured by binding plural prismatic porous ceramic members each having many through-holes arranged side by side in the longitudinal direction across a partition wall which functions as a filter for collecting particles, plural adhesive sheets are stripped from the end face of the honeycomb filter by pressing a stripping sheet coated with an adhesive having stronger adhesive strength than that of the adhesive sheet on the end face of the honeycomb filter to stick the adhesive sheet to the stripping sheet, and then pulling off the stripping sheet.



## **LEGAL STATUS**

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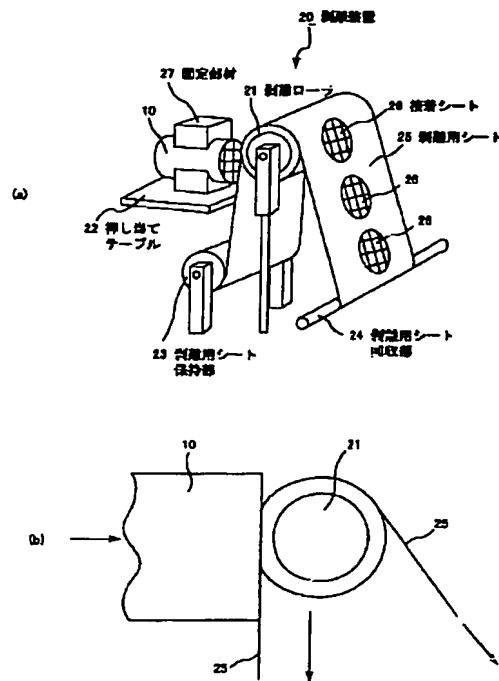
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Fターム(参考) 4D019 AA01 BA05 BB06 BB10 CA01  
CB04 CB06 CB07

(54)【発明の名称】接着シートの剥離方法及び剥離装置

(57)【要約】

【課題】 ハニカムフィルタの端面に接着された接着シートをハニカムフィルタの端面から、該端面を傷つけることなく迅速に、かつ、確実に剥離することができる接着シートの剥離方法を提供する。

【解決手段】 多数の貫通孔が隔壁を隔てて長手方向に並設された角柱形状の多孔質セラミック部材が接着層を介して複数個結束され、上記貫通孔を隔てる隔壁が粒子捕集用フィルタとして機能するよう構成されたハニカムフィルタの端面に貼り付けた複数の接着シートを剥離する方法であって、上記接着シートの粘着力よりも強い粘着力を有する粘着剤を塗布した剥離用シートを、上記ハニカムフィルタの端面に押し当て、上記剥離用シートに上記接着シートを接着し、その後、上記剥離用シートを引き離すことにより、複数の上記接着シートを上記ハニカムフィルタの端面から剥離させることを特徴とする接着シートの剥離方法。



【特許請求の範囲】

【請求項1】 多数の貫通孔が隔壁を隔てて長手方向に並設された角柱形状の多孔質セラミック部材が接着層を介して複数個結束され、前記貫通孔を隔てる隔壁が粒子捕集用フィルタとして機能するように構成されたハニカムフィルタの端面に貼り付けた複数の接着シートを剥離する方法であって、前記接着シートの粘着力よりも強い粘着力を有する粘着剤を塗布した剥離用シートを、前記ハニカムフィルタの端面に押し当て、前記剥離用シートに前記接着シートを接着し、その後、前記剥離用シートを前記端面より引き離すことにより、複数の前記接着シートを前記ハニカムフィルタの端面から剥離させることを特徴とする接着シートの剥離方法。

【請求項2】 ローラをハニカムフィルタの端面に沿って転がすことにより、前記ハニカムフィルタの端面に剥離用シートを押し当て、前記剥離用シートに接着シートを接着する請求項1記載の接着シートの剥離方法。

【請求項3】 少なくともローラの表面は、40°～60°の硬度を有する弹性体からなる請求項2記載の接着シートの剥離方法。

【請求項4】 少なくともローラの表面は、ウレタン系発泡ゴム又はクロロブレン系スポンジゴムからなる請求項2又は3記載の接着シートの剥離方法。

【請求項5】 多数の貫通孔が隔壁を隔てて長手方向に並設された角柱形状の多孔質セラミック部材が接着層を介して複数個結束され、前記貫通孔を隔てる隔壁が粒子捕集用フィルタとして機能するように構成されたハニカムフィルタの端面に貼り付けた複数の接着シートを剥離するための剥離装置であって、剥離ローラと、前記剥離ローラを前記ハニカムフィルタの端面に沿って平行に移動させるローラ駆動手段と、押し当てテーブルと、前記押し当てテーブル上で前記ハニカムフィルタを保持、固定する固定部材と、前記押し当てテーブルを前記ハニカムフィルタの端面に垂直な方向に移動させるテーブル駆動手段と、剥離用シートを巻き付けた状態で保持する剥離用シート保持部と、前記剥離用シートを前記剥離ローラを介して巻き取る剥離用シート回収部とを主な構成部材とし、前記剥離用シート保持部から引き出された前記剥離用シートは、前記剥離ローラが前記ハニカムフィルタの端面に沿って平行に移動することにより、前記接着シートに接着するように構成されていることを特徴とする剥離装置。

【請求項6】 少なくとも剥離ローラの表面は、40°～60°の硬度を有する弹性体からなる請求項5記載の剥離装置。

【請求項7】 少なくとも剥離ローラの表面は、ウレタン系発泡ゴム又はクロロブレン系スポンジゴムからなる請求項5又は6記載の剥離装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、ハニカムフィルタの端面に接着された接着シートをハニカムフィルタの端面から剥離する際、該端面を傷つけることなく、迅速にかつ確実に剥離することができる接着シートの剥離方法、及び、剥離装置に関する。

【0002】

【従来の技術】自動車、バス、トラック等の車両や建設機械等の内燃機関から排出される排気ガス中に含有されるパティキュレートが環境や人体に害を及ぼすことが最近問題となっている。この排気ガスを多孔質セラミックを通過させることにより、排気ガス中のパティキュレートを捕集して排気ガスを浄化するセラミックフィルタが種々提案されている。

【0003】このようなセラミックフィルタは、通常、図1に示したハニカムフィルタ10のように、複数の炭化珪素等からなる多孔質セラミック部材30が、接着層14を介して結束されてセラミックブロック15を構成し、このセラミックブロック15の周囲にシール材層13が形成されている。また、この多孔質セラミック部材30は、図2に示したように、長手方向に多数の貫通孔31が並設され、貫通孔31同士を隔てる隔壁33がフィルタとして機能するようになっている。

【0004】即ち、多孔質セラミック部材30に形成された貫通孔31は、図2(b)に示したように、排気ガスの入り口側又は出口側の端部のいずれかが充填材32により目封じされ、一の貫通孔31に流入した排気ガスは、必ず貫通孔31を隔てる隔壁33を通過した後、他の貫通孔31から流出されるようになっている。

【0005】排気ガス浄化装置では、このような構成のハニカムフィルタ10が内燃機関の排気通路に設置され、内燃機関より排出された排気ガス中のパティキュレートは、このハニカムフィルタ10を通過する際に隔壁33により捕捉され、排気ガスが浄化される。

【0006】ここで、シール材層13は、ハニカムフィルタ10を内燃機関の排気通路に設置した際、ハニカムフィルタ10の外周部から排気ガスが漏れ出すことを防止する等の目的で設けられているものである。

【0007】従来、このようなシール材層13をハニカムフィルタ10の外周部に形成するには、まず、多孔質セラミック部材30を複数個接着層14を介して結束してセラミックブロック15を作製し、このセラミックブロック15をその軸方向に軸支し、回転させる。

【0008】次に、シール材層13を形成するためのシール材ペーストをセラミックブロック15の外周部に付着させた後、上記シール材ペーストに板状部材を接触させて、上記シール材ペーストを均一な厚さに引き延ばしてペースト層を形成し、このペースト層を乾燥、固化させることにより、セラミックブロック15の外周部にシール材層13を形成していた。

【0009】しかしながら、このような方法でセラミッ

クブロック15の外周部にシール材層13を形成しようとすると、上記シール材ペーストがセラミックブロック15の端面部分にはみ出し、貫通孔31が形成されている部分に付着し、貫通孔31を塞いでしまうことがあった。このようにシール材ペーストが、貫通孔31を塞いでしまうと、貫通孔31は目詰まりとなり、ハニカムフィルタ10のフィルタとしての機能が低下してしまう。【0010】そこで、このような貫通孔31の目詰まりを防止するために、セラミックブロック15の外周部にシール材層13を形成する際には、セラミックブロック15の両端面に接着シート等を接着してカバーしておく必要があった。

【0011】しかしながら、このようなハニカムフィルタの両端面に接着した接着シートの剥離作業は、カッターやへら等を用いて手作業で行っていたため、生産性に劣るものであった。また、上記ハニカムフィルタの端面を上記カッターやへらで傷つけてしまう場合があった。

#### 【0012】

【発明が解決しようとする課題】本発明は、これらの問題を解決するためになされたもので、ハニカムフィルタの端面に接着された接着シートをハニカムフィルタの端面から剥離する際、該端面を傷つけることなく、迅速にかつ確実に剥離することができる接着シートの剥離方法、及び、剥離装置を提供することにある。

#### 【0013】

【課題を解決するための手段】本発明の接着シートの剥離方法は、多数の貫通孔が隔壁を隔てて長手方向に並設された角柱形状の多孔質セラミック部材が接着層を介して複数個結束され、上記貫通孔を隔てる隔壁が粒子捕集用フィルタとして機能するように構成されたハニカムフィルタの端面に貼り付けた複数の接着シートを剥離する方法であって、上記接着シートの粘着力よりも強い粘着力を有する粘着剤を塗布した剥離用シートを、上記ハニカムフィルタの端面に押し当て、上記剥離用シートに上記接着シートを接着し、その後、上記剥離用シートを上記端面より引き離すことにより、複数の上記接着シートを上記ハニカムフィルタの端面から剥離させることを特徴とするものである。

【0014】また、本発明の剥離装置は、多数の貫通孔が隔壁を隔てて長手方向に並設された角柱形状の多孔質セラミック部材が接着層を介して複数個結束され、上記貫通孔を隔てる隔壁が粒子捕集用フィルタとして機能するように構成されたハニカムフィルタの端面に貼り付けた複数の接着シートを剥離するための剥離装置であって、剥離ローラと、上記剥離ローラを上記ハニカムフィルタの端面に沿って平行に移動させるローラ駆動手段と、押し当てテーブルと、上記押し当てテーブル上で上記ハニカムフィルタを保持、固定する固定部材と、上記押し当てテーブルを上記ハニカムフィルタの端面に垂直な方向に移動させるテーブル駆動手段と、剥離用シート

を巻き付けた状態で保持する剥離用シート保持部と、上記剥離用シートを上記剥離ローラを介して巻き取る剥離用シート回収部とを主な構成部材とし、上記剥離用シート保持部から引き出された上記剥離用シートは、上記剥離ローラが上記ハニカムフィルタの端面に沿って平行に移動することにより、上記接着シートに接着するように構成されていることを特徴とするものである。以下、本発明の接着シートの剥離方法及び剥離装置について説明する。

#### 【0015】

【発明の実施の形態】本発明の接着シートの剥離方法は、多数の貫通孔が隔壁を隔てて長手方向に並設された角柱形状の多孔質セラミック部材が接着層を介して複数個結束され、上記貫通孔を隔てる隔壁が粒子捕集用フィルタとして機能するように構成されたハニカムフィルタの端面に貼り付けた複数の接着シートを剥離する方法であって、上記接着シートの粘着力よりも強い粘着力を有する粘着剤を塗布した剥離用シートを、上記ハニカムフィルタの端面に押し当て、上記剥離用シートに上記接着シートを接着し、その後、上記剥離用シートを上記端面より引き離すことにより、複数の上記接着シートを上記ハニカムフィルタの端面から剥離させることを特徴とするものである。

【0016】本発明の接着シートの剥離方法において、上記接着シートの接着の対象となるハニカムフィルタは、上記従来の技術で説明したハニカムフィルタ10と同様のものを挙げることができる。従って、ここでは、その構造に関する説明は、省略することとする。なお、上記ハニカムフィルタの製造方法については、後述する。

【0017】本発明の接着シートの剥離方法においては、まず、ハニカムフィルタの端面に貼り付けた接着シートの粘着力よりも強い粘着力を有する粘着剤を塗布した剥離用シートを、上記ハニカムフィルタの端面に押し当て、上記剥離用シートに上記接着シートを接着する。

【0018】上記接着シートとしてはある程度の耐熱性、強度及び低伸長率を有するものであれば特に限定されず、例えば、ポリエステルフィルムに粘着剤として耐熱性ゴム系粘着剤を塗布したもの等を挙げができる。

【0019】上記接着シートは、120°C以上の耐熱性を有することが望ましい。耐熱性が120°C未満であると、ハニカムフィルタを製造する際の乾燥工程等において、上記接着シートが分解し、剥がれてしまうことがある。上記接着シートの耐熱性は150°C以上であることがより望ましい。

【0020】上記接着シートは、150°C程度の温度領域で5~15kg/19mm幅の引っ張り荷重を有することが望ましい。引っ張り荷重が5kg/19mm幅未満であると、ハニカムフィルタの製造途中で、接着シート

トが破損してしまうことがある。一方、引っ張り荷重が15kg/19mm幅を超えると、充分な強度を有するため、これ以上の強度を有する接着シートは、製造コストの高騰を招く。

【0021】上記接着シートは、150°C程度の温度領域で30~150%の伸長率を有するものであることが望ましい。伸長率が30%未満であると、接着シートが脆くなり、破断しやすくなる。一方、伸長率が150%を超えると、セラミック部材を組み上げた積層体を切削してセラミックブロックの形状に切削する際、接着シートが伸長するために、セラミックブロックと同じ形状に切断されず、セラミックブロックの外周部に付着したり、玉状の固まりが発生してしまう場合がある。また、切削の際に剥がれてしまう場合もある。

【0022】上記接着シートの粘着力は、500~2000g/19mm幅であることが望ましい。粘着力が500g/19mm幅未満であると、接着剤層やシール材層を形成する前に剥離してしまうことがある。一方、粘着力が2000g/19mm幅を超えると、接着シートの剥離工程で、接着シートを完全に剥離することが困難となる。

【0023】上記接着シートの粘着力よりも強い粘着力を有する粘着剤を塗布した剥離用シートとしては、例えば、ポリエステルフィルムにゴム系粘着剤を塗布したもの等を挙げることができる。

【0024】上記剥離用シートの粘着力は、3000~8000g/25mm幅であることが望ましい。粘着力が3000g/25mm幅未満であると、粘着力が不充分であり、接着シートをハニカムフィルタの端面から完全に剥離することができない場合がある。一方、粘着力が8000g/25mm幅を超えると、粘着力が強すぎるため、取り扱い性に劣り、また、接着シートを剥離するのに充分な粘着力があり、これ以上の粘着力を有する剥離用シートは、製造コストの高騰を招く。

【0025】また、上記剥離用シートの形状は、ハニカムフィルタの端面と略同形状、矩形状等任意の形状のものを挙げができるが、そのサイズとしては、ハニカムフィルタの端面を完全に覆うことができるものである必要がある。ハニカムフィルタの端面の略全面に貼り付けた接着シートを完全に接着する必要があるからである。

【0026】また、上記剥離用シートの形状は帯状であってもよい。この場合も上記と同様の理由により、剥離用シートの幅がハニカムフィルタの端面の直径より大きい必要がある。

【0027】上記剥離用シートの厚さは特に限定されず、例えば、25~50μmであることが望ましい。25μm未満であると、剥離用シートの強度が低下してしまい、後のハニカムフィルタの端面から引き離す際に切断してしまう場合がある。一方、50μmを超えると、

その強度は充分であるが、硬くなってしまい、その取り扱い性に劣ることとなる。

【0028】このような剥離用シートをハニカムフィルタの端面に押し当てる方法としては特に限定されず、任意の方法で押し当てることができるが、ローラをハニカムフィルタの端面に沿って転がす方法が望ましい。均一な押圧で剥離用シートをハニカムフィルタの端面に押し当てるができるからである。

【0029】上記ローラの直径は、押し当てる対象であるハニカムフィルタの端面の直径に合わせて適宜調整されるが、50~200mm程度であることが望ましい。直径が50mm未満であると、ローラをハニカムフィルタの端面の一端部から中心を挟んだ他端部まで転がすのに時間がかかり、生産性の低下を招く。一方、直径が200mmを超えると、均一な押圧で接着シートをハニカムフィルタの端面に押し当てることが困難となる。

【0030】また、上記ローラの幅は特に限定されず、ハニカムフィルタの端面の直径よりも少し大きくなるように調整されることが望ましい。一度だけ、上記ローラをハニカムフィルタの端面に沿って転がせばよいからである。

【0031】また、少なくとも上記ローラの表面は、40~60°の硬度を有する弾性体であることが望ましい。上記ローラを用いて剥離用シートをハニカムフィルタの端面に押し当てる際、剥離用シートや接着シート、及び、ハニカムフィルタの端面の破損を防止するためである。

【0032】上記弾性体は、上記ローラの表面から少なくとも5mmの厚さで形成されていることが望ましい。弾性体の厚さが5mm未満であると、ローラをハニカムフィルタの端面に押し当てる際、上記弾性体が変形し、ローラの弾性体非形成部分にまで押圧がかかり、剥離用シート、接着シート、及び、ハニカムフィルタの端面が破損するおそれがある。なお、「少なくとも」であるから、上記ローラの全体が上記弾性体からなるものであつてもよい。

【0033】上記弾性体としては、ウレタン系発泡ゴム又はクロロブレン系スポンジゴムであることが望ましい。適度な硬度を有するものであり、剥離用シートをハニカムフィルタの端面に押し当てる際、ハニカムフィルタの端面と接触している部分が適度に変形し、剥離用シートと接着シートとを確実に貼り付けることができるからである。

【0034】また、上記弾性体としては、ネオプレンスポンジゴムであることが最も望ましい。50°と好適な硬度を有し、ハニカムフィルタの端面に押し当てる際、剥離用シート、接着シート及びハニカムフィルタの端面を傷つけることがなく、また、ハニカムフィルタの端面と接触する上記ネオプレンスponsjゴムが適度に変形し、確実に接着シート全体を剥離用シートに貼り付ける

ことができるからである。また、その加工性にも優れる。

【0035】その他の弹性体の例としては、例えば、スチレン・ブタジエンゴム、ブタジエンゴム、イソブレンゴム、クロロブレンゴム、ウレタンゴム、シリコーンゴム等の合成ゴムやポリイソブチレン、ポリエチレン等のエラストマー、発泡ポリウレタン、発泡ポリスチレン、発泡ポリエチレン、発泡ポリプロピレン等のプラスチック発泡体、その他、天然ゴム、スポンジゴム等を挙げることができる。

【0036】また、上記ローラの上記弹性体以外の部分を構成する材料としては特に限定されず、例えば、セラミック、樹脂、金属等の材料を挙げることができる。

【0037】次に、剥離用シートをハニカムフィルタの端面に押し当て、剥離用シートに接着シートを貼り付けた後、上記剥離用シートをハニカムフィルタの端面から引き離すことにより、複数の上記接着シートをハニカムフィルタの端面から剥離させる。

【0038】剥離用シートをハニカムフィルタの端面から引き離す際、上記剥離用シートとハニカムフィルタの端面とが成す角度（引き離し角）としては、15～60°であることが望ましい。引き離し角が15°未満であると、剥離用シートをハニカムフィルタの端面に略平行な方向に引っ張る必要があり、大きな剪断力が剥離用シートとハニカムフィルタの端面との間に作用し、接着シートがハニカムフィルタの端面から剥がれる前に、その引っ張り方向にずれてしまい、上記耐熱性ゴム系粘着剤等の粘着剤が、ハニカムフィルタの端面に付着することがある。一方、引き離し角が60°を超えると、剥離用シートの引き離し速度が大きくなりすぎ、接着シートがハニカムフィルタの端面に残ってしまうことがある。

【0039】また、剥離用シートをハニカムフィルタの端面から引き離す際、剥離用シートを接着させる際と逆の方向に、上記ローラを転がしながら行うことが望ましい。上記引き離し角を常に一定にすることができるからである。

【0040】次に、本発明において、剥離処理の対象となる接着シートが貼り付けられたハニカムフィルタの製造方法について、図面を参照しながら説明する。

【0041】まず、図1に示したような、多数の貫通孔31が隔壁33を隔てて長手方向に並設された角柱形状の多孔質セラミック部材30が、接着層14を介して複数個結合された構造のセラミックブロック15を作製する。

【0042】多孔質セラミック部材30を構成するセラミック材料としては特に限定されず、種々のセラミックが挙げられるが、これらのなかでは、耐熱性が大きく、機械的特性に優れ、かつ、熱伝導率も大きい炭化珪素が好ましい。

【0043】多孔質セラミック部材30は、平均粒径が

2～150μmのセラミック結晶からなるものであることが望ましく、10～70μmがより望ましい。上記セラミック結晶の平均粒径が2μm未満であると、多孔質セラミック部材30の内部に存在する気孔の気孔径が小さくなりすぎ、直ぐに目詰まりを起こすため、フィルタとして機能することが困難となる。一方、上記セラミック結晶の平均粒径が150μmを超えると、その内部に存在する気孔の気孔径が大きくなりすぎ、多孔質セラミック部材30の強度が低下してしまうおそれがある。また、所定の割合の開放気孔を有し、平均粒径が150μmを超えるようなセラミック結晶を有する多孔質セラミック部材30を製造すること自体が余り容易でない。

【0044】このような多孔質セラミック部材30の両端面に接着シートを貼り付ける。多孔質セラミック部材30に形成した多数の貫通孔を保護するためである。上記接着シートを多孔質セラミック部材30の両端面に貼り付ける方法としては特に限定されず、例えば、多孔質セラミック部材30の端面形状にカットした接着シートを機械アームで自動的に貼り付けてもよく、手で貼り付けてもよい。

【0045】次に、図4に示したように、多孔質セラミック部材30が斜めに傾斜した状態で積み上げができるように、断面V字形状に構成された台60の上に、多孔質セラミック部材30を傾斜した状態で載置した後、上側を向いた2つの側面30a、30bに、接着層14となるペースト状の接着剤を均一な厚さで塗布して接着剤層を形成し、この接着剤層の上に、順次他の多孔質セラミック部材30を積層する工程を繰り返し、所定の大きさの角柱状の多孔質セラミック部材30の積層体を作製する。

【0046】次に、この多孔質セラミック部材30の積層体を50～150°C、1時間程度の条件で加熱して上記接着剤層を乾燥、固化させて接着層14とし、その後、例えば、ダイヤモンドカッター等を用いて、その外周部を図1に示したような形状に切削することで、セラミックブロック15を作製することができる。この際、上記接着シートは、剥がれたり、切削された多孔質セラミック部材30と異なる形状となったりすることなく、切削された多孔質セラミック部材30と同様の形状に切削される。

【0047】接着層14となるペースト状の接着剤としては、耐熱性を有するものであれば特に限定されず、例えば、有機バインダー、無機バインダー、無機繊維及び無機粒子を含むペーストを挙げることができる。このような組成からなるペーストは、多孔質セラミックとの馴染みがよく接着強度に優れるとともに、熱伝導率にも優れたものとなる。

【0048】そして、このようにして作製したセラミックブロック15の外周部分に、例えば、上記接着層14と同様の材料からなるシール材13を形成し、乾燥、固

化することにより、本発明の接着シートの剥離方法の対象となる接着シートが接着されたハニカムフィルタ10を得ることができる。

【0049】本発明の接着シートの剥離方法は、ハニカムフィルタの端面に貼り付けた複数の接着シートの全体を、該接着シートの粘着力よりも強い粘着力を有する剥離用シートで接着し、その後、上記剥離用シートを引き離す方法である。従って、上記接着シートは、上記剥離用シートに強固に接着され、上記剥離用シートの引き離しに伴って、ハニカムフィルタの端面から該端面を傷つけることなく迅速に、かつ、確実に剥離させることができる。

【0050】上記接着シートの剥離方法においては、例えば、剥離用シートのサイズを大きなものとし、該剥離用シートを複数のハニカムフィルタの端面に同時に押し当て、その後、上記剥離用シートを引き離すことと、同時に複数のハニカムフィルタの端面に貼り付けた接着シートを剥離するようにしてもよい。

【0051】また、上記接着シートの剥離方法においては、ハニカムフィルタの端面に剥離用シートを押し当てることにより、上記剥離用シートに上記接着シートを接着させるものであったが、本発明の接着シートの剥離方法は、例えば、剥離用シートをテーブルの上に固定しておき、この剥離用シートに、ハニカムフィルタの端面を押し当て、該端面に貼り付けた複数の接着シートと剥離用シートとを接着させ、その後、ハニカムフィルタを引き離す方法を採用してもよい。

【0052】この場合、上記テーブルのハニカムフィルタの端面を押し当てる箇所には、上述したような弾性体が形成されていることが望ましい。ハニカムフィルタの端面、接着シート、及び、剥離用シートの破損を防止するためである。

【0053】次に、本発明の剥離装置について図面を参照しながら説明する。

【0054】本発明の剥離装置は、多数の貫通孔が隔壁を隔てて長手方向に並設された角柱形状の多孔質セラミック部材が接着層を介して複数個結束され、上記貫通孔を隔てる隔壁が粒子捕集用フィルタとして機能するよう構成されたハニカムフィルタの端面に貼り付けた複数の接着シートを剥離するための剥離装置であって、剥離ローラと、上記剥離ローラを上記ハニカムフィルタの端面に沿って平行に移動させるローラ駆動手段と、押し当てテーブルと、上記押し当てテーブル上で上記ハニカムフィルタを保持、固定する固定部材と、上記押し当てテーブルを上記ハニカムフィルタの端面に垂直な方向に移動させるテーブル駆動手段と、剥離用シートを巻き付けた状態で保持する剥離用シート保持部と、上記剥離用シートを上記剥離ローラを介して巻き取る剥離用シート回収部とを主な構成部材とし、上記剥離用シート保持部から引き出された上記剥離用シートは、上記剥離ローラが

上記ハニカムフィルタの端面に沿って平行に移動することにより、上記接着シートに接着するように構成されていることを特徴とするものである。

【0055】図3(a)は、本発明の剥離装置の一例を模式的に示した斜視図であり、(b)は、その部分拡大正面図である。

【0056】図3に示した通り、本発明の剥離装置20は、主に、剥離ローラ21、押し当てテーブル22、剥離用シート保持部23及び剥離用シート回収部24から構成されており、剥離ローラ21は、この剥離ローラ21をハニカムフィルタ10の端面に沿って平行に移動させるローラ駆動手段(図示せず)を備えている。剥離ローラ21の下方には、巻き付けた状態の剥離用シート25を保持した剥離用シート保持部23が設けられ、この剥離用シート保持部23から引き出された剥離用シート25は、同じく剥離ローラ21の下方に設けられた剥離用シート回収部24に、剥離ローラ21を介して巻き取られるようになっている。

【0057】また、押し当てテーブル22の上には、ハニカムフィルタ10をその上下から挟み込むように保持、固定する固定部材27が設置されるとともに、テーブル駆動手段(図示せず)が設けられており、このテーブル駆動手段により、押し当てテーブル22を、押し当てテーブル22に固定されたハニカムフィルタ10の端面に垂直な方向(水平方向)に移動させることができるようになっている。

【0058】剥離ローラ21は、上記接着シートの剥離方法で説明したローラと同様のものを用いることができる。従って、ここでは、その材質、形状等に関する詳しい説明を省略することとする。また、剥離用シート25及び接着シート26についても同様である。

【0059】上述したように、この剥離ローラ21には、剥離ローラ21をハニカムフィルタ10の端面に沿って平行に移動させるためのローラ駆動手段が設けられている。上記駆動手段としては特に限定されず、例えば、電気モーター、油圧式ピストン、エアーピストン等を挙げることができる。

【0060】このローラ駆動手段を駆動させることにより、(b)に示すように、剥離ローラ21をハニカムフィルタ10の端面に平行に移動させ、剥離用シート25をハニカムフィルタ10の端面に押し当てる。その移動速度は、ハニカムフィルタ10の端面の面積、剥離用シート25の粘着力等を考慮して適宜調整されるが、例えば、10~40mm/secであることが望ましい。移動速度が10mm/sec未満であると、剥離用シート25をハニカムフィルタ10の端面に押し当てるのに時間がかかり、生産性に劣る。一方、移動速度が40mm/secを超えると、確実に接着シート26を剥離用シート25に接着することができない場合がある。

【0061】押し当てテーブル22としては特に限定さ

れず、例えば、金属、樹脂、セラミック等からなるものを挙げることができ、その一面にハニカムフィルタ10を載置することができるものであれば、その形状も特に図示したような板状には限られない。

【0062】固定部材27の材質としては、押し当てテーブル22と同様のものを挙げができる。また、その形状もハニカムフィルタ10を確実に保持、固定することができるような形状であれば特に限定されず、図示したような上下からハニカムフィルタ10を挟み込むような形状であってもよく、左右から挟み込むような形状等であってもよい。ただし、ハニカムフィルタ10を固定部材27で保持、固定する際、ハニカムフィルタ10の端面が遮られることの無いように固定する必要がある。剥離用シート25をハニカムフィルタ10の端面に押し当てる必要があるからである。

【0063】押し当てテーブル22を水平方向に移動させるためのテーブル駆動手段としては、上述した剥離ローラ21に設けられた駆動手段と同様のものを挙げることができる。

【0064】押し当てテーブル22をハニカムフィルタ10の端面に垂直に移動させるのは、剥離ローラ21により剥離用シート25をハニカムフィルタ10の端面に押し当てることができる位置まで押し当てテーブル22を移動するためであり、任意の速度で移動させることができる。

【0065】なお、押し当てテーブル22は、固定部材27に上記駆動手段を設け、固定部材27をハニカムフィルタの端面に垂直に移動させることができる構造にすることで、省略することができる。

【0066】剥離用シート保持部23としては、剥離用シート25を保持し、かつ、剥離ローラ21に向けて引き出すことができるような構造であれば特に限定されないが、図示したように、巻き付けられた状態の剥離用シート25をその回転軸方向に軸支し、剥離用シート25に一定以上の力を加えることにより引き出されるように構成されていることが望ましい。

【0067】また、剥離用シート25を引き出した際、粘着剤層が形成された面がハニカムフィルタ10の端面の方を向くように保持されている必要がある。剥離用シート25とハニカムフィルタ10の端面に貼り付けた接着シート26とを接着するためである。

【0068】剥離用シート回収部24としては剥離用シート25を回収することができるものであれば特に限定されず、例えば、金属、樹脂、セラミック等からなる棒状のものを挙げができる、その形状も特に限定されないが、図示したような円柱状のものが望ましい。回転しながら良好に剥離用シート25を回収することができるからである。また、その長さは、剥離用シート25の幅に合わせて適宜調整される。

【0069】次に、このような構成からなる本発明の剥

離装置を用いて、ハニカムフィルタの端面に貼り付けた複数の接着シートを剥離する工程について説明する。

【0070】(1)まず、剥離用シート保持部23に巻き付けられた状態の剥離用シート25を、粘着剤層が形成された面がハニカムフィルタ10の端面の方を向くよう設置した後、剥離用シート25を引き出し、剥離ローラ21を介して剥離用シート回収部24に巻き付ける。

【0071】(2)次に、押し当てテーブル22の上面に、固定部材27を上下から挟み込むことによりハニカムフィルタ10を保持、固定する。なお、このとき、剥離ローラ21は、ハニカムフィルタ10よりも下方に位置している。

【0072】(3)次に、図示しないテーブル駆動手段により、ハニカムフィルタ10の端面と、剥離ローラ21の押し当てテーブル22側の外周部の真上部分とが交差する位置まで、押し当てテーブル22を水平方向に移動させ固定する。

【0073】この時、剥離ローラ21をハニカムフィルタ10の端面に押し当てた際、発生する押圧力が0.05~0.3 MPaとなるように押し当てテーブル22を移動、固定する。押圧力が0.05 MPa未満であると、剥離用シート25に接着シート26を完全に接着させることができない場合がある。一方、押圧力が0.3 MPaを超えると、剥離用シート25、接着シート26及びハニカムフィルタ10の端面に破損が生じる場合がある。

【0074】(4)次に、剥離用シート25を巻き付けた剥離用シート回収部24を回転しないように固定し、剥離ローラ21を図示しないローラ駆動手段によりハニカムフィルタ10の端面に沿って平行(上方)に移動させ、ハニカムフィルタ10の端面に沿って剥離ローラ21を転がしながら剥離用シート25をハニカムフィルタ10の端面に押し当てるにより、複数の接着シート26の全面に剥離用シート25を接着させる。この時、剥離ローラ21が、剥離用シート25を介してハニカムフィルタ10の端面と接觸している部分の幅は特に限定されないが、例えば、5mm前後であることが望ましい。

【0075】(5)その後、剥離ローラの駆動手段を停止して、一旦、剥離ローラ21の動きを止め、続いて、剥離用シート保持部23が回転しないように固定した後、剥離用シート回収部24を回転させることにより、剥離ローラ21を下方へ移動させる。これにより、剥離用シート25をハニカムフィルタ10の端面から引き離すとともに、接着シート26をハニカムフィルタ10の端面から剥離させる。

【0076】(6)そして、テーブル駆動手段により、押し当てテーブル22を剥離ローラ21から離れるように移動させ、ハニカムフィルタ10を取り外す。続い

て、剥離用シート保持部23の固定を解除し、剥離用シート回収部24を回転させて、剥離用シート25を約200mm程度新たに引き出す。

【0077】上記(2)～(6)の工程を順次繰り返すことで、ハニカムフィルタの端面に貼り付けた接着シートの剥離工程を連続的に行うことができる。

【0078】本発明の剥離装置は上述した通りであるので、上記剥離装置を使用することで、ハニカムフィルタの端面に貼り付けた接着シートを、ハニカムフィルタの端面から該端面を傷つけることなく迅速に、かつ、確実に剥離することができる。

【0079】また、本発明の剥離装置の別の実施の形態として、例えば、剥離用シート及び押し当てテーブルの幅をより大きなものとし、複数のハニカムフィルタを上記押し当てテーブルに載置することができるような構造とすることで、一度に複数のハニカムフィルタの端面に貼り付けた接着シートを剥離することができる剥離装置としてもよい。

【0080】また、本発明の剥離装置の更に別の実施の形態として、例えば、押し当てテーブルを、縦方向に複数のハニカムフィルタを保持、固定することができるような構造にすることでも、一度に複数のハニカムフィルタの端面に貼り付けた接着シートを剥離することができる剥離装置としてもよい。また、本発明の剥離装置は、これらの剥離装置を合体させたような構造であってもよい。

【0081】

【実施例】以下に実施例を掲げて本発明を更に詳しく説明するが、本発明はこれら実施例のみに限定されるものではない。

【0082】実施例1

初めに、粘着剤として熱硬化性ゴム系粘着剤を塗布したポリエステルフィルムからなる接着シート(日東電工社製:No.315)を、その両端面に貼り付けたハニカムフィルタを製造した。なお、上記接着シートの強度は150°C、4時間加熱後で9.5kg/19mm幅であり、その伸長率は150°C、4時間加熱後で80%であり、その粘着力は、1200g/19mm幅であった。

【0083】次に、上記実施の形態において説明した本発明の剥離装置の固定部材に上記ハニカムフィルタを設置した後、上記ハニカムフィルタの端面に貼り付けた複数の接着シートの剥離試験を行った。

【0084】なお、剥離用シートはゴム系粘着剤を塗布したポリエステルフィルム(スコッチ社製:No.859)であり、その幅は20cmであり、粘着力は5000gf/25mm幅であった。

【0085】また、上記剥離装置を構成する剥離ローラは、直径10cm、幅25cmの円柱状であり、その外周部から3.5cmまでがネオプレンスponジゴム(硬度50°)からなり、その他の部分はウレタンゴムから

なるものであった。また、剥離ローラがハニカムフィルタの端面を平行に移動する移動速度は35mm/secであった。また、押し当てテーブルは、SUS製の板状体であった。

【0086】また、剥離ローラで剥離用シートをハニカムフィルタの端面に押し当てた際の押圧力は0.15MPaであった。

【0087】本実施例1において、ハニカムフィルタの端面に貼り付けた接着シートの剥離工程に要した時間は5秒/個であり、また、完全に上記接着シートを剥離することができた。

【0088】実施例2

剥離用シートをブチルゴム系粘着剤を塗布したポリエチレンフィルム(住友3M社製:No.152A、粘着力:3000gf/25mm幅)を使用したほかは、実施例1と同様にして接着シートの剥離試験を行った。

【0089】その結果、ハニカムフィルタの端面に貼り付けた接着シートの剥離工程に要した時間は5秒/個であり、また、完全に上記接着シートを剥離することができた。

【0090】比較例1

実施例1と同様にして、その両端面に接着シートを貼り付けたハニカムフィルタを製造し、この接着シートを剥離工程をへら用いて手作業で行った。

【0091】その結果、比較例1においては、ハニカムフィルタの端面に貼り付けた接着シートを完全に剥離するのに要した時間は30秒/個であり、一部に欠けが生じたものがあった。

【0092】実施例1、2及び比較例1の結果から明らかなように、実施例1、2に係る接着シートの剥離工程は極めて短時間で、かつ、確実に接着シートを剥離することができるのに対し、比較例1に係る接着シートの剥離工程は長時間を要し、また、一部のハニカムフィルタの端面に欠けが生じ、接着シートを一度に剥離することができなかった。

【0093】

【発明の効果】本発明の接着シートの剥離方法は、上述の通りであるので、ハニカムフィルタの端面に貼り付けた複数の接着シートの全体を該接着シートの粘着力よりも強い粘着力を有する剥離用シートで接着し、その後、上記剥離用シートを引き離す方法であるので、上記剥離用シートに強固に接着された上記接着シートを、上記剥離用シートの引き離しに伴って、ハニカムフィルタの端面から該端面を傷つけることなく迅速に、かつ、確実に剥離させることができる。

【0094】また、本発明の剥離装置は、上述の通りであるので、本発明の剥離装置を使用することで、接着シートを、ハニカムフィルタの端面から該端面を傷つけることなく迅速に、かつ、確実に剥離することができる。

【図面の簡単な説明】

【図1】本発明の接着シートの剥離方法で、剥離用シートの押し当ての対象であるハニカムフィルタの一実施形態を模式的に示した斜視図である。

【図2】(a)は、図1に示したハニカムフィルタを構成する多孔質セラミック部材を模式的に示した斜視図であり、(b)は、そのA-A線断面図である。

【図3】(a)は、本発明の剥離装置の一例を模式的に示した斜視図であり、(b)は、その部分拡大断面図である。

【図4】図1に示したハニカムフィルタを製造する一工程を模式的に示した説明図である。

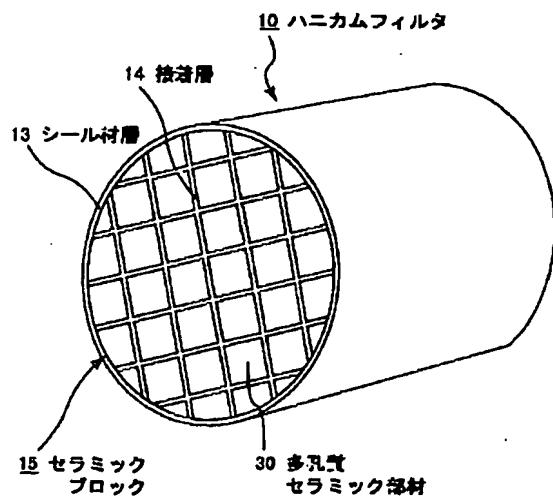
【符号の説明】

10 ハニカムフィルタ

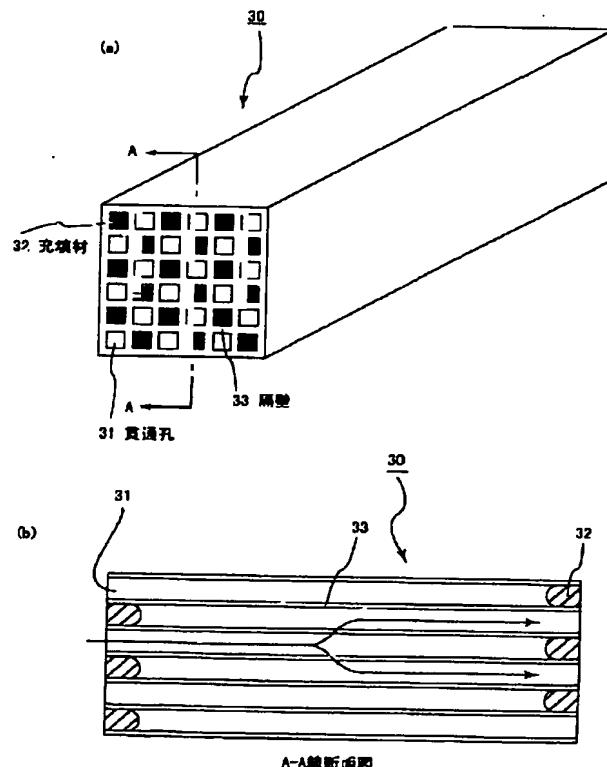
13 シール材層

- 14 接着層
- 15 セラミックブロック
- 20 剥離装置
- 21 剥離ローラ
- 22 押し当てテーブル
- 23 剥離用シート保持部
- 24 剥離用シート回収部
- 25 剥離用シート
- 26 接着シート
- 27 固定部材
- 30 多孔質セラミック部材
- 31 貫通孔
- 32 充填材
- 33 隔壁

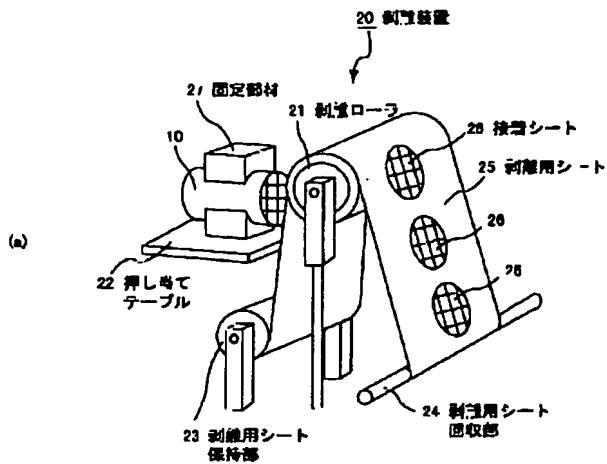
【図1】



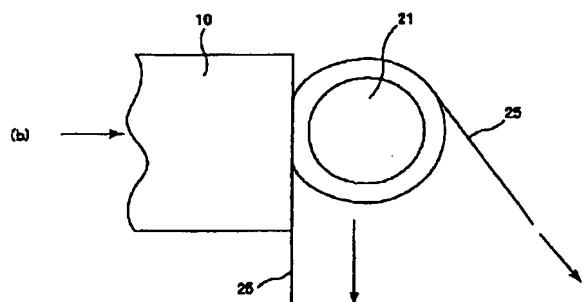
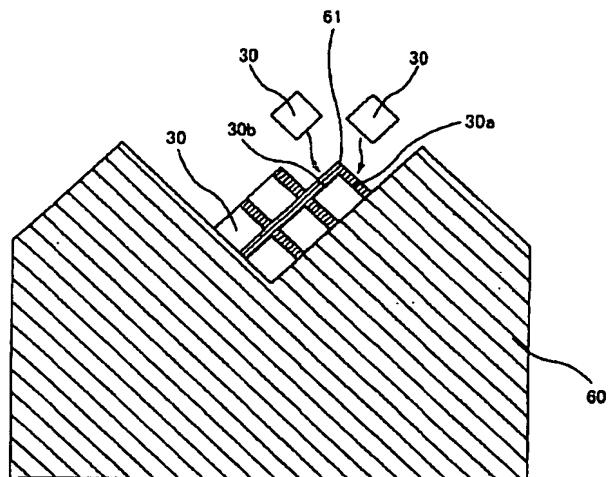
【図2】



【図3】



【図4】



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